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MEDICAL NEWS LETTER

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Antibiotics in Fixed Combination

A growing awareness exists among physicians and the intelligent lay public of some of the problems resulting from widespread and indiscriminate use of antibiotics. This applies particularly to the increasing prevalence and seriousness of infections caused by antibiotic-resistant strains of bacteria. The critical role that combinations of antibiotics may have had in bringing about the present state of affairs seems still to be little realized by the medical profession.

The worst of the antibiotic combinations is the mixture of penicillin and streptomycin, employed to treat many cases when streptomycin is almost always redundant. Unfortunately, it also is used for the prophylaxis of nearly all infections—which it rarely prevents. Instead, it contributes to the occurrence and increased severity of antibiotic-resistant infections and serious toxic effects.

Recently, a combination of tetracycline and oleandomycin has been promoted. This combination was supposed to epitomize the "New Antibiotic Era" or the "Third Antibiotic Era" (the second being that of the broad-spectrum antibiotics). Apparently, the promotion of this product was much more successful than the attempts of a number of authorities in the field to point out its defects through scientific reports and editorials in leading medical journals. A large number of new combinations of other antibiotics, or mixtures of antibiotics with various sulfonamides, and mixture of antibiotics with other drugs having pharmacologic properties have been introduced. Their use has been promoted for initial therapy before an etiologic diagnosis is reached or for use in mild or poorly defined cases in which diagnosis may be difficult and in which bacteriologic confirmation seems not worth bothering about or is impossible to obtain.

All fixed combinations currently available have the following serious objections—real or potential:

They encourage "shotgun therapy," which discourages the study and observation of the patient.

They fail to provide optimum treatment.

They contain constituents of which at least one has the tendency to give rise rapidly to increased resistance.

They occasion an increase in occurrence and spread, and probably also potentiate the virulence of certain organisms that are usually saprophytic.

One or the other constituent may be particularly useful in certain serious specific infections and should best be reserved for use in circumstances in which it may be specifically indicated. Moreover, it is impossible to selectively adjust the dose of one constituent to provide optimum therapy.

Since none of the combinations have clearly shown any therapeutic advantage in patients over the proper use of the more effective component alone,

the patient is unnecessarily placed in "double jeopardy" of toxic reactions and acquiring sensitization to both agents.

It is discouraging and disquieting that, in spite of repeated exposition of the defects of the fixed combinations and the potential or actual dangers of their application, they are still being prescribed in sufficient quantity, both here and abroad, to encourage the manufacturers in continuing their production and in prompting their use. It cannot be too strongly emphasized that the best interest of the individual patient is served and the least harm done when antibiotics are prescribed, each in its optimum dosage and only for infections in which it is specifically indicated. Their possible curative and life-saving properties will also best be preserved for other patients if they are always used in this manner only. (Editorial: New England J. Med., 262: 255-256, February 4, 1960)

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Tranquilizing Drugs - 1959

Drugs to give man a sense of peace or emotional comfort have been used since time immemorial; they have included everything from alcohol, opiates and the solanaceous group through marihuana, bromides, barbiturates, and—more recently—a new group of drugs which are included under the general terms, "tranquilizers" or ataractics.

What has man be seeking? Why has he had to avoid certain unpleasant sensory experiences, signals that came into his eyes, ears, nose, tactile system, taste, or combinations thereof? What was going on within his brain that he was seeking a respite even in the earliest days? Was it fear of the dark, attack by animals, by fellow man? Was he frightened by the phenomena of nature—thunder, lightning, torrential rains, freezing cold, avalanches, landslides, or the like?

Within him were defenses against anxiety—the same mechanisms we all possess to handle tension. This is normal human physiology which enables a soldier to go into combat despite fear, which permits an individual to go on despite a depression after the loss of a loved one. Man could get surcease from his problems by going to sleep, provided he could fall asleep. However, this remarkable mechanism can be decompensated.

Early man learned that the fermented grape or starchy substance could produce a chemical which gave relief from anxious feelings. Far back in the history of man, therefore, alcohol became available. The alchemist was present early on the scene to provide drugs from various botanical substances—deadly nightshade, poppy, hemp plant, and others. In more recent times (1826), came the discovery of bromides by Ballard, of barbiturates by Baeyer (1863), and most recently, the latest group of drugs—the tranquilizers. Bein first described the peculiar property of reserpine as a sedative and

hypnotic. He pointed out that animals would become tranquil and assume a resting position. They were never anesthetized and could be aroused by acoustic or tactile stimuli. Application of others—chlorpromazine and meprobamate—soon followed. All became known as "tranquilizing" or ataractic drugs, called by some "phrenotropic" or "psychotropic."

The remarkable feature of the tranquilizing drugs is their complete dissimilarity in terms of chemical structure. Yet they have a striking similarity in many aspects in action. Certain specific differences have been observed and demonstrated in the laboratory. The difficulty is augmented when one moves from the laboratory of the experimental animal to the area of man. Individuality of response provides unpredictable variability of actions.

Why the difference? As is well known, alcohol—like any other drug of its kind—can only depress, it cannot stimulate. For example, to use the analogy of an automobile—if a depressive or retarding action were exerted on the governor which prevents acceleration of a car, the car would actually go faster. In other words, the retarder would be retarded and, therefore, permit speed-up of the automobile.

The brain is a complex of elaborate neural circuits. They feed backward or forward, reverberate, and send or receive from other circuits. Thus, the brain is a system of balances and counterbalances which makes possible the smoothing effect on muscular motion, transmission of sensation, and formulation of judgments. Think of how elaborate the brain mechanisms must be in what is considered the general term, "behavior." These mechanisms combine into a complex, dynamic network loaded with engrams—neural pictures of life's experiences—all functioning at different levels of awareness, each pattern highly individual.

Into this elaborate mechanism of wires, relays, and subcenters is thrown a chemical substance—alcohol, barbiturates, bromides, tranquilizers—and it is said, "The drug acts on the brain." Where on the brain? Are all brains the same? Engrams are as different as are people. Therefore, when these drugs depress a part of the circuitry of the brain, the result is release, and what is released is that which is available. The drug pulls the lid off the Pandora's box of the nervous system and whatever is contained in that box proceeds to tumble out. All lids do not come off in the same way—the way in which one is drawn back by barbiturates is quite different from the way exerted by tranquilizers.

Dosage is another factor. A small dose of one substance may produce an entirely different effect than a larger one.

In human beings, one cannot evaluate drugs without taking into consideration the so-called placebo effect. Studies indicate that placebo effects are not imaginary, nor are they results of suggestion. The investigations of Stewart Wolf have been particularly revealing, and his conclusions would indicate that the mechanism responsible for placebo responses is connected with circuits in the cerebral cortex.

The question then arises, "Shall we use drugs?" The answer is, "Of course, where the situation demands it." Certain general rules must be kept in mind. Aging brains do not tolerate powerful sedatives well—this produces confusion. Certain drugs when taken in large doses over a long period of time may have a dangerous sequel. If the individual is suddenly taken off medication, he may develop a withdrawal syndrome with convulsions and psychosis. If a patient has a convulsive diathesis and is on large doses of phenobarbital, sudden removal of the drug may result in status epilepticus. Bromides in large doses may produce intoxication. Many a diagnostic error has been made by the unwary as a result of this effect.

The effect of the drug depends upon the level of the symptom to be relieved. If a patient starts with intense pain, morphine is about 75% effective. A placebo given to that patient is about 35% effective. As the pain becomes less severe, the placebo benefit drops. If the patient is very anxious, any drug is about 60 to 70% effective, and the placebo is close to this figure.

Therefore, where do physicians stand with these tranquilizing drugs? It is essential to keep in mind that these drugs may exert their clinical effects of quieting or tranquilizing without the severe depression or the heavy sedation characteristic of other drugs like the barbiturates or opiates.

On the other hand, such drugs should not be used arbitrarily only to control a symptom. A patient who is vomiting should not be given chlorpromazine to control it before the physician has learned the cause of the vomitint. Specific problems usually indicate a specific drug, keeping in mind that reserpine has been known to precipitate or aggravate latent depressions; chlorpromazine in large doses may produce a parkinsonian-like state; and chlorpromazine is the one most likely to produce liver damage and jaundice.

One cannot pick up an article on tranquilizing drugs without reading about their effect on psychotic patients. Yet, during the years past, these same enthusiastic effects were attributed to drugs introduced during various preceding eras.

Physicians may properly ask, "Has anything new been added?" The answer is a categoric "Yes." In the last 10 years, they have become familiar with a large group of drugs which enable them to handle many conditions which, heretofore, were necessarily treated with more sedative, more depressing, more hypnotic, and more confusing drugs. Patients are clearer now and are able to go about their business more effectively. Yet, the very volume of the drugs that are sold is frightening. Too many patients start with a physician and then continue treatment on their own. In one instance in Texas—which is not to be outdone—a patient was taking almost 15,000 mg. of chloproma-zine daily! There are dangers and limitations, and proper precautions should be established. Similarly, there are many instances where a physician dealing with a functional problem handles the symptoms by prescribing a tranquilizing drug rather than sitting down with the patient to learn what is causing

the anxiety. This sets up the vicious cycle of making the patient dependent upon a drug, and never comes to grips with the basic emotional difficulty underlying the symptom.

Therefore, tranquilizing drugs are useful and, comparatively speaking, safe. They are not miracle drugs—newspapers and lay magazines notwithstanding. They are therapeutic substances and, thus, are welcome to the medical armamentarium. They are to be employed in symptomatic treatment; they are not curative of specific conditions in the sense that quinine can be used for the cure of malaria, or penicillin for pneumonia. They merely handle the disturbance in the neural communication system. They are useful in that they render the patient more available for approach by the physician who may then be able to communicate with the patient and get to the underlying cause.

In short, these drugs are tranquilizers, or facilitators, but they are never a substitute for a full doctor-patient relationship. (Boshes, B., The Status of Tranquilizing Drugs - 1959: Ann. Int. Med., 52: 182-194, January 1960)

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Newer Drugs in Amebiasis

Amebiasis, a systemic disease, is by no means confined to the tropics. It is prevalent in the environment regardless of latitude, where personal, community, or institutional hygiene is not adequately controlled. Thus, one sees a high incidence of chronic or "carrier" amebiasis in areas of a low level of sanitation.

Because ambeiasis constitutes a pathologic state with diffuse invasion of the mucosa of the large bowel accompanied by tissue lysis, there is little evidence of an inflammatory reaction. The tissue most frequently invaded beyond the bowel is the liver where abscess formation may occur without bacterial involvement. In the lumen of the bowel, on the other hand, the bacterial flora may influence the invasive propensity of the ameba. Again, in the tissue phase of amebiasis only the trophozoites are found, whereas in the lumen of the colon either cysts (in chronic or "carrier" states) or trophozoites (in acute dysentery) may occur. Thus, one finds the therapeutic problem complex, the selection of drug depending on the site of invasion and presence or absence of associated organisms, in addition to consideration of presence of the cystic and trophic forms which have to be combated. One does not wonder that there is no single agent which is completely effective.

To complicate the matter further, it has become evident that amebae exist in the colon in symbiosis with certain bacteria. Thus, amebae with their associated bacteria in the colon present an entirely different

therapeutic problem from that encountered when amebae without associated bacteria invade hepatic tissue. Blanket, or "combined," therapy for liver involvement is difficult to justify.

Symptoms alone are not adequate reasons for antiamebic therapy. Too often, in patients who have once had a diagnosis of amebiasis, treatment is carried far beyond reasonable limits, and repeated by every subsequent physician who may believe the symptom complex relates to the ameba. Diagnostic criteria must be established. First, the physician should be certain that the patient has E. histolytica which can best be demonstrated in iron-hematoxylin-stained fecal specimens. After six negative specimens, proctoscopy and scrapings of the bowel wall should be performed. Barium studies often prove helpful.

While some still favor combined therapy with the inclusion of potentially toxic agents—such as use of emetine in chronic amebiasis—it is believed desirable to avoid mixed "shotgun" regimens over protracted periods. One should select the agent most likely to be effective and then proceed in steplike fashion to other chemical types until eradication is accomplished.

Intestinal amebiasis may be treated by: (1) Carbarsone, U. S. P. (or Thiocarbarsone); (2) iodochlorhydroxyquin (Vioform); (3) fumagillin, N. N. D.; (4) erythromycin, U. S. P.; (5) tetracyclines or bacitracin, U. S. P.

Against hepatic amebiasis, chloroquine phosphate, U. S. P., has largely replaced emetine. Only when recurrence of infection takes place (25% of cases) is one justified in using emetine in nonambulatory patients.

Among many drugs of natural origin and newer chemical derivatives currently under study, some have appeared to warrant some continued use in experimental therapy.

Glycobiarsol, N. F. (Milibis). This agent has had extensive trials during the past 5 years, usually in combination with other agents. Since it contains arsenic, there is some concern regarding toxicity. Because of this possibility, chronic therapy with this or other "suppressive" agents against cyst-passers in amebiasis is restricted to periods of one month or less. Low solubility and poor absorption limit the usefulness of glycobiarsol to the prevalent intestinal form of the disease.

Dichloro-derivatives. (1) Mantomide. Studies have revealed this substance to be well tolerated in all species in which it has been observed. Although absorbed, much of the drug undergoes metabolic alteration. In man, however, it eliminates cysts of E. histolytica in asymptomatic individuals. It is distinctly less effective in symptomatic amebiasis, and in hepatic amebiasis it has been reported ineffective. Most recently (1950), Donckaster and his collaborators, reporting on the use of this agent in 80 cases of chronic amebiasis, conclude that its use is not justified.

(2) Entamide. On clinical trial, Entamide, likewise, was more effective in asymptomatic patients harboring E. histolytica than against trophozoites

in patients who exhibited symptoms of disease. The drug is reported to be more active against infections in which cysts of the large race are present.

(3) Mebinol. One group of experimenters expressed the belief that, in therapy of artificially infected rodents, this compound may be approximately four times as effective as Mantomide in man. When it is used in 0.5 gm. amounts orally three times a day over 10 or more days, cyst-passers are rid of the amebae. The same dose given twice weekly is under study as a suppressive. After daily therapy as noted above, another group reported that a one-week follow-up revealed a cure rate of 77%. No toxic effects were reported. At present, it appears that Mebinol may become the more active of the dichloracetamides, especially in suppressive therapy.

(4) Entobex. In man, a semicarbazone relative of this substance is less well tolerated than Entobex, although it is more active in hepatic amebiasis. From various reports it would appear that Entobex is less active against cysts of E. histolytica than against trophozoites. To be certain, a longer period of follow-up will be required to determine the effectiveness of Entobex and variations in intestinal amebiasis.

MA-307. A totally different chemical class, the diamines, were studied. Among these, MA-307 proved to be active in vitro within the range of emetine. While no conclusions are warranted from published data, it would appear possible that in cases which require emetine hydrochloride beyond the amounts usually recommended, MA-307 might be considered as a less toxic agent.

Paromomycin (Humatin). Among the newer antibiotics, paromomycin which exhibits broad antibacterial activity has been reported in the treatment of amebic dysentery. It is said to have controlled experimental infections in rats and dogs and to have given better results than similar doses of neomycin. No damage to kidneys, liver, or bone marrow was reported following 7 weeks of oral administration to dogs. Absorption from the gut is limited. Shafei believes that "antibacterial effect may explain the more favorable results obtained in acute dysentery with concomitant bacterial infection when paromomycin is used." (Anderson, H. H., Newer Drugs in Amebiasis: Clinical Pharmacology and Therapeutics, 1: 78-86, January - February 1960)

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Change of Address

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Brain Damage from Chronic Alcoholism

Studies of hundreds of patients made by the authors during the past 7 or 8 years point to the rising incidence of acute and chronic stages of alcoholic brain disease; and to the existence of a midway stage which they have called the intermediate brain syndrome. Their findings concerning these stages—particularly the intermediate one—have implications for practical treatment and a preventive program.

Pathologic drinking, chronic alcoholism, and alcoholic addiction have become a major national problem. Of some 70 million persons who use alcohol without undue harm, the question is raised as to why some 5 million use it at times to excess, and why about one-fifth of them are alcohol addicts. The conclusion is that existing knowledge and tools must be used to the utmost until research yields more adequate data regarding causes of alcoholism and methods of treatment.

Many persons still find it difficult to understand that alcoholism is a disease; that alcohol addiction is an advanced stage which may lead to such other serious diseases as hepatic, metabolic, renal, cardiac, and organic brain diseases. Lemere points out that the habit-forming properties of alcohol have been insufficiently stressed in the literature; that most alcoholics may drink for years "before they gradually and insidiously slip over into uncontrolled pathologic drinking." He ascribes the loss of control to "physical changes that take place in the brain after years of heavy drinking."

Alcoholic brain disease is usually classified as: (a) acute alcoholic brain syndrome—a reversible stage; and (b) chronic brain syndrome, cortical atrophy and midbrain involvement, and organic dementia (Korsakoff's or Wernicke's disease)—an irreversible stage.

In the past 6 years, about 750 patients were admitted for alcoholism to the psychiatric department under the authors' observation. Electroencephalographic studies showed that in about one-third of these patients the persistently abnormal EEG pattern would finally return to normal after months of sobriety. Cortical cerebral atrophy was present in most cases of chronic alcoholism.

Clinical observations of the intermediate stage of brain damage reveal such symptoms as rationalization of drinking, pathologic lying, infantile behavior, poor judgment, hostility, emotional lability, defiance, denial of illness, and lack of insight. The drinking pattern is addictive, dependent. or compulsive, usually with daytime and solitary drinking. Physiologic reactions include blackouts, withdrawal reactions, and severe hangovers. There are delirioid or convulsive episodes in about 50% of cases, and systemic complications, such as fatty liver, cirrhosis, and polyneuritis. The main psychologic test findings are perceptual (visual) organization defect, intellectual and personality deterioration, and impaired abstraction.

The clinical picture, therefore, consists of two factors: the underlying addiction-prone personality and the alcohol pathology. The two factors are not easily separated in a given case. After an acute episode, the underlying personality disorder tends to be emphasized and the incipient stage of brain syndrome to be unnoticed.

Korsakoff's psychosis or Wernicke's disease forms the classic symptoms of chronic brain syndrome. There is hemorrhage or other degenerative processes in the mid-brain, due mainly to nutritional deficiency. Pathology is also usually found in the cortex because alcohol by its narcotic and anoxic effect on nerve tissues leads to cell death and cerebral atrophy.

Differentiation of stages of the syndrome depends on a careful study of laboratory, clinical, and psychologic findings. Only when the patient's mental symptoms of acute intoxication are related mainly to cortical function, and when the abnormal EEG record persists after the acute episode, do the combined findings point to chronic cortical pathology.

Prompt recognition of the early stages leads to a proper therapeutic program. Such patients first need medical care of the organic features of brain damage. Half of these patients have other systemic diseases, such as liver damage, which must be treated. Education of relatives as well as the patient as to the significance of brain damage is important.

Because in many chronic alcoholic addicts, alcoholic brain disease eventually develops, the widely held concept of alcoholism as primarily a symptom of a character disorder must be modified. In the initial stage of alcoholism, before addiction is firmly established, psychotherapy is often helpful. But after the onset of alcoholic brain disease, all therapeutic efforts must be directed toward helping the patient rehabilitate himself.

Even though patients are informed of the seriousness of alcoholic brain damage, they are especially difficult to treat and may continue drinking. Then, they may soon die of intercurrent disease, or by suicide; or they may become permanent institutional cases. If control can be established until the organic features clear and judgment returns to a fairly normal level, insight can gradually be established. Then, motivation to learn to live without alcohol is aroused. Psychiatric evaluation to determine whether the alcoholism is symptomatic of a neurosis or psychosis also must be considered.

After insight is gained, psychotherapeutic efforts may be fruitful along with social and other supportive measures, such as Alcoholics Anonymous, to bring about effective rehabilitation.

The problem of alcohol addiction eventually should be tackled at a national level with general education of the public as to the prevalence of chronic alcoholism and need for its control. Problems of treatment and prevention would have to be handled at the level of a public health program with substitution of a public health medical approach instead of the present punitive one. By this means, many persons could be reached before addiction becomes established and brain disease becomes irreversible.

In all large cities, skid rows comprise a major problem. For example, in San Francisco—the country's most alcoholic city—the relief and welfare program for alcoholics costs taxpayers 4 million dollars a year.

The cost of a program of detecting addicts with incipient or established brain damage should be borne by a tax on profits of the liquor industry at the source—breweries, wineries, and distilleries. Although these industries do not cause alcoholism, the use of their products contributes to the problem of addiction and mental deterioration. (Bennett, A. E., Mowery, G. L., Fort, J. T., Brain Damage from Chronic Alcoholism: Am. J. Psychiat., 116: 705-711, February 1960)

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Surgical Treatment of Stage 1 Cancer of the Cervix

Surgical mortality is no longer a valid argument against surgical treatment of cancer of the cervix as in the early decades of this century. In view of the results achieved by radiation therapy for this disease, the question arises as to which method of management would appear more efficacious—if indeed there may be a choice.

The authors recorded the results of a surgical program pursued at Memorial Center since 1947, in which all patients were considered as surgical problems regardless of age, obesity, or complicating medical conditions. Between 1947 and 1953, there were 177 patients who were classified clinically as having stage 1 disease. In only 3 instances was radiation employed rather than surgery because of complicating medical problems. In addition, 9 patients received radiation as the method of choice by reason of other circumstances. Of the group, 132 patients had operations envisaging "cure"—radical panhysterectomy and pelvic lymph node dissection.

The surgical attack upon stage 1 cervical cancer proved efficacious in the series described in this report in which no selection of patients was followed, but in which all patients did not come to operation because of a variety of circumstances.

Among 104 patients with macroscopic lesions which varied in size from 5 mm. to involvement of all of the cervix or endocervix, and in whom positive node metastases were undetected, the 5-year salvage rate was 87%. When pelvic node metastases were present (22 cases, or 15% of the total series), the 5-year salvage rate was 50%.

In view of the studies on radiosensitivity prediction by smear or serial biopsies, the studies discussed may prove of value as a yardstick showing what surgery can accomplish in unselected cases of stage 1 cervical cancer. In the absence of node metastases, it would appear that methods of prediction,

to be significant, will have to provide substantially better 5-year salvage rates than 87%. Evaluation would have to be between comparable patients treated only by radiation or only by surgery. (Brunschwig, A., Surgical Treatment of Stage 1 Cancer of the Cervix: Cancer, 13: 34-36, January - February 1960)

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Ivalon - A Tissue Substitute

In reconstructive surgical procedures, prosthetic materials not infrequently are required for replacement of lost tissue. Implanted foreign materials, such as tantalum, vitallium, and stainless steel have many limitations. Foremost among their shortcomings is a failure to become incorporated in the surrounding tissues. In recent years, the development of polyvinyl-formal (surgical Ivalon) seems to afford a more satisfactory means of artificial replacement of tissue. Surgical Ivalon is a synthetic material which apparently acts as a suitable supportive framework for living tissue, having the necessary resilient and elastic qualities. When implanted, it is freely permeable to body fluids, becomes vascularized, and permits development of fibroplasia.

Implants of Ivalon were made in animals by the authors, and observations were made one month to 7 years following implantation.

Although satisfactory in many ways, one main objection to the use of Ivalon as a replacement for soft tissue is its tendency to change in consistency (to become firm) and in size (to undergo shrinkage). However, in reconstructive work where Ivalon is implanted in close proximity to bone and cartilage, such factors might be desirable.

Living tissues seem to tolerate Ivalon unusually well, probably because of two factors: (1) its chemical characteristics, and (2) its absorption. Polyvinyl-formal produces practically no reaction in living tissue. No appreciable deterioration and no signs of foreign-body irritation are observed in Ivalon implants if strict sterile technique is followed. Ivalon sponge will absorb approximately twelve times its dry weight. Tissue fluids enter the sponge; growing cells follow the fluid into the small chambers where they find the physiologic conditions for life and growth.

Living tissue that invades Ivalon is responsible for the change in size and consistency of the implant. The contracture of the noninflammatory fibrous tissue and deposition of calcium salts should be considered as causative factors in the shrinkage and hardening of implanted Ivalon sponge.

Studying the effects in animals, the authors observed that deposition of calcium seemed to be related more to the time element than to the presence of irritants. However, additional irritation, inflammation, or trauma result in increased shrinkage and firmness of the transplant. Therefore, surgical

Ivalon sponge should always be free of sulfuric acid, formalin, or other irritating chemicals. It should be handled with strict aseptic technique.

The observations of the authors do not confirm other reports that polyvinyl sponge is absorbed by living tissue. But, no doubt, some microscopic portions of Ivalon could well be enclosed and carried away by foreign-body giant cells.

Reports of others have indicated that various plastic films are carcinogenic. In the authors' experiments, no evidence was observed that Ivalon sponge embedded in tissues produced neoplasms.

The tendency of Ivalon to become firm due to fibrosis probably will remain largely unavoidable. Every foreign implant invaded by fibrous elements will, in time, become firm. Further experimental study—possibly in changing the pH of Ivalon—may contribute to the development of a substance that will show diminished deposits of calcium and thereby probably allow the sponge to remain more pliable and resilient. (Schwartz, A. W., Erich, J. B., Experimental Study of Polyvinyl-Formal (Ivalon) Sponge as a Substitute for Tissue: Plast. Reconstr Surg., 25: 1-14, January 1960)

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Diagnosis of Gastric Ulcer

For many years, the manner of treatment of gastric ulcer has been a subject of controversy. Evidence has accumulated indicating that malignant change in gastric ulcer actually is quite rare, probably not exceeding an incidence of 1 to 1.5%. The inability to differentiate with certainty the benign from the malignant ulcer by recognized orthodox diagnostic techniques is the usual reason given by present proponents of "surgery for all gastric ulcers." Their platform has become more tenable in recent years because of the achievement of a low surgical mortality rate—1 to 2% in expert hands.

Through utilization of new or improved diagnostic methods for differentiating benign and malignant ulcers, the diagnostic error of the initial survey has decreased to approximately 10%. Fortunately, utilization of the therapeutic medical trial as a means of differential diagnosis has reduced the diagnostic error to 1 to 3% in some clinics. Actually, the mortality rate of gastric resection in the hands of the most experienced surgeons, and the rate of late appearance of malignancy in the stomach treated medically for so-called benign ulcer, are almost identical. Therefore, other reasons must be given for advocating either the "all surgical" or the "prolonged medical" plan of management.

The authors believe that the statistical analysis which they present serves to support their thesis that the safest plan is a reappraisal of the

lesion by x-ray after a brief period of physiologic stomach rest by rigid diet.

On the basis of the initial diagnostic appraisal—history, physical examination, roentgen study, fractional gastric analysis, other laboratory studies, and in certain instances, gastroscopy and cytologic examination of gastric sediment—the lesion is classified provisionally into one of three categories: (1) possibly malignant ulcer; (2) probably benign ulcer, complicated; and (3) probably benign ulcer, uncomplicated.

Immediate operation is recommended for all patients who present any one of the criteria for category (1): accepted roentgen criteria, achlorhydria, and in some instances, gastroscopic, cytologic, and other laboratory findings.

Operation is advised also for category (2) patients after a brief period of stomach rest by rigid diet to alleviate concomitant edema and congestion. This renders the operation more easily performed and with less likelihood of postoperative sequelae.

Category (3) patients are the principal subjects of the authors' consideration. All such patients are subjected to a rigid regimen for 2 weeks—preferably in the hospital, removed from aggravating environmental circumstances and where strict adherence to the complete program is assured. The patient is placed at bed rest except for bathroom privileges. The diet schedule is rigid with hourly feedings of whole milk (130-150 ml.) from 0700 to 2200 and during the night if the patient is awakened with distress. No solid food or meals are permitted; only in this way is "physiologic stomach rest" achieved. Midway between the hourly feedings, 8 ml. of a liquid, nonabsorbable antacid (usually a combination of magnesium trisilicate and aluminum hydroxide) are administered. Mild daytime sedation with a liquid or parenteral preparation of a barbiturate is permissible in the early stage of management to suppress tension or anxiety. Subthreshold doses of liquid cholinergics may be employed in the absence of gastric stasis.

The authors consider that this rigid physiologic stomach rest regimen employed for 2 weeks—but never more than 3—is sufficient to determine whether the lesion will respond to medical therapy. On the regimen, the crater of most uncomplicated benign ulcers will reduce in size by 50% or more as measured roentgenographically. Failure to obtain such a response justifies operation without further delay. If the healing rate is satisfactory, dietary modifications are made and x-ray reevaluations are performed at 2-week intervals until complete healing has occurred.

The authors' statistical analysis suggests that utilization of "satisfactory healing by x-ray" after a 2-week period of treatment is the best criteria for making a correct decision of surgery versus continued medical management in the apparently benign gastric ulcer. Few malignant ulcers will escape discovery by the double pronged diagnostic method of (1) the initial diagnostic tests, and, if apparently benign, (2) the rigid 2-week diet as a test of healing rate.

The accuracy of such an approach depends upon strict adherence to the rules by the patient and the physician. (Paustian, F. F., et al., The Diagnosis of Benign Versus Malignant Gastric Ulcer: Gastroenterology, 38: 155-164, February 1960)

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Basic Nursing Care - New Film Release

Release of 6 new films in the series, "Basic Nursing Care," (MN-8576), brings to 16 the total number of training films on nursing techniques for hospital corpsmen. The 6 new pictures are in black and white and have an average running time of 15 minutes.

"Intravenous Administration of Fluids," Part E, demonstrates the corpsman's responsibilities in addition to specific procedures to be followed in preparing a patient and assisting the medical officer in the administration of large doses of fluids. Part F, "Preoperative Care," shows the corpsman's duties in relation to a patient during the 16 to 24 hours before surgery: checking for completion of lab work; supervision of the patient's meals and intake of water and other fluids; administration of the cleansing enema; preparation of the skin at the operative site; administration of a hypnotic during the evening before surgery; provision of routine morning care on the day of surgery; and procedures immediately before the patient is taken to the operating room. Part G, "Postoperative Care," treats in like detail the corpsman's responsibilities for the patient immediately after surgery. Part H, "Eye Treatments," shows in detail the treatments that a corpsman gives under orders of the medical officer: examination of the eye by eversion of the lids, and application of eye drops; application of ophthalmic ointment; irrigation of the eye; and application of hot and cold compresses. Part I, "Ear, Nose and Throat Treatments," demonstrates: instillation of ear drops; irrigation of the ear; instillation of nose drops; application of nasal sprays and throat sprays; and irrigation of the throat. Part J, "Oral Administration of Medications" shows: preparation of medication and treatment cards; use of a medication and treatment board as a reminder to ward personnel to administer medications at correct times; preparation of doses of various oral medications; and procedures for administration of medication to patients.

The four parts of the series previously distributed, MN-8576 A through D, are "Making an Unoccupied Bed," "Making a Recovery Bed," "Making the Occupied Bed," and "The Bed Bath." These augment the following earlier films: "Vital Signs (MN-8211), comprising three parts—"Cardinal Symptoms," "Taking Temperature, Pulse and Respiration," and "Taking Blood Pressure"—and "Needle Injections" (MN-8405), also in three parts—"Equipment and Medications," "Intradermal, Subcutaneous and Intramuscular Injection Techniques," and "Intravenous Needle-Injection Technique."

Prints of all films are being distributed to District Libraries, Naval Hospitals, and Hospital Corps Schools. If prints are not available through the usual source, address inquiry to the Film Distribution Unit, Training Division, Bureau of Naval Personnel, Department of the Navy, Washington 25, D. C.

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Admiral Burke Starts Sixth Term as President of Navy Mutual Aid Association

The Board of Directors of the Navy Mutual Aid Association at their Annual Meeting on 16 February 1960 announced the reelection of Admiral Arleigh Burke USN as President. Other officers elected by the membership were Rear Admiral A. H. Van Keuren USN (Ret), First Vice President; Vice Admiral E. W. Clexton USN, Second Vice President; Lieutenant General W. M. Greene Jr. USMC, Third Vice President; Vice Admiral K. K. Cowart USCG (Ret), Fourth Vice President; and CAPT R. R. Rambo MC USN, Vice President-Medical Director. CAPT T. S. Dukeshire SC USN (Ret) was re-elected Secretary and Treasurer, and LCDR T. L. Jackson MSC USN (Ret) as Assistant Secretary and Treasurer.

The Chase Manhattan Bank of New York continues as investment counsel for the Association and the Morgan Guaranty Trust Company of New York retains custody of the Association's bond portfolio. The actuarial firm of Bowles, Andrews & Towne of Richmond, Va. will continue to serve as the Association's actuarial adviser.

Admiral Burke addressed the Board briefly on the accomplishments of the Association and the contributions it had made to Navy morale over the 80 years of its existence. He said that hard work, honesty, integrity, and devotion to duty were the way of life of a Naval officer; that nowhere had he seen these traits better exemplified than in the services which the individual Board members rendered to their brother officers. He noted particularly the unique services which the Association performed for the survivors of Navy officers and mentioned the many instances which had come to his personal attention of the prompt and capable manner in which these services had been performed. The Navy Mutual Aid, said the Admiral, has become, through the years, an institution of which the Navy might well be proud.

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1958).

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BUDOCKS INSTRUCTION 3440.8 29 January 1960

Subj: Passive Defense; new terminology for

The purpose of this instruction is to provide notice of the use of new terminology for the title "Passive Defense." After the effective date of this instruction, the term "Disaster Control" shall be used to describe the Navy functions formerly referred to as "Passive Defense." Effective date of this instruction is 1 February 1960.

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BUMED NOTICE 6250 11 February 1960

Subj: Shipboard storage of insecticides; change in policy

This directive promulgates an advance change to Manual of Naval Preventive Medicine, NavMed P-5010-9, article 9-32 (3) (c) relative to shipboard storage of insecticides.

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BUMED INSTRUCTION 1510.4E 19 February 1960

Subj: Training available to enlisted personnel of the Hospital Corps, Group X

The purpose of this instruction is to promulgate information relative to training available to Group X, Hospital Corps personnel and to supplement the Catalog of Hospital Corps Schools and Courses (BuMedInst 1510.9).

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BUMED NOTICE 6820 23 February 1960

Subj: Handbook of the Hospital Corps, U.S. Navy (1960), NavMed P-5004

This instruction provides notification that the following sections of the Handbook are now available in the Navy Supply Systems and may be procured in accordance with BuMedInst 6820.10 of 18 February 1960; (a) Binder; (b) Chapter Dividers; (c) Chapter IV—Nursing and Nursing Procedures; (d) Chapter VII—Basic Pharmacology and Review of Toxicology.

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From the Note Book

Russian Scientists Visit NNMC. Three Russian medical scientists recently visited the Tissue Bank at the National Naval Medical Center, Bethesda, Md. Professor Mikhail M. Tarasov of the Sklifosovsky Institute in Moscow, who is an exponent of use of cadaver blood, stated that the work of the Center and the Tissue Bank is well known to scientists of the Soviet Union. Other visitors were Professor Anastasy G. Lapchinsky of Moscow's Institute of Experimental Surgical Apparatus and Instruments where amputated limbs of animals have been rejoined to the same animal; and Dr. E. A. Zotikov of Moscow's Institute of Experimental Biology who is concerned with the problem of rejection of transplants of tissue grafted from one person to another. (TIO, BuMed)

Holiday Highway Deaths. During the 15-day period—18 December through 1 January—of the last Christmas season, 36 Navy-Marine Corps personnel were killed on the highways. The Sixth District suffered the highest toll with 3 Navy and 5 Marine Corps deaths; the Fifth and Eighth Districts were next with 6 deaths each. The 36 deaths of this season were 6 more than the corresponding period of the preceding year—Marine Corps sustaining 12 as compared with 5 last year and the Navy 24 as compared with 25. (Statistics of Navy Medicine, February 1960)

International Research Conference. The Surgeon General has announced that the Medical Department of the Navy will be host to an International Research Conference on burns during the month of September 1960. The conference, to be held at the National Naval Medical Center, Bethesda, Md., is designed for the exchange of current research information. It is expected that there will be about 20 foreign and 100 American participants. (TIO, BuMed)

Medico-Legal Symposium. For the first time, the three armed services are cooperating in the planning of a symposium on forensic medicine. It will be composed of 3 days of lectures, panels, and demonstrations beginning 3 May 1960 at the Armed Forces Institute of Pathology. Purpose: To indoctrinate and orient hospital commanders, base and post surgeons, military police, legal officers, and certain other personnel in medico-legal problems and to promote better understanding among doctors, lawyers, and law enforcement agents. (Washington Report on the Medical Sciences, 15 February 1960)

The Hemodynamic Concept of Atherosclerosis. This concept considers the laws of fluid dynamics as the primary factor in the pathogenesis of atherosclerosis. The laws of fluid mechanics, the authors state, can account for localization, progressive development, and varied pathologic appearance of atherosclerotic lesions at specific areas of predilection. Contributing or

secondary factors—sex, race, diet, nutritional status, habitus, lipid metabolism, drugs, hormones, et cetera—exert their effect on the basic force of hemodynamics. (M. Texon, et al., A.M.A. Arch. Surg., January 1960)

Heparin Neutralization. Searching for the most effective agent for neutralizing heparin action following open-heart surgery, the authors observed that polybrene is a more effective agent than protamin. (C. Lillehei, et al., Ann. Surg., January 1960)

Radiation Myelitis. Myelitis occurring after radiation therapy has been reported relatively infrequently. However, increased depth doses made possible by supervoltage radiation increase the likelihood of occurrence. It is mandatory that the radiotherapist be aware of dangers of overlap of fields and large doses with single fields, because symptoms are considerably delayed and not present during the treatment period. (J. Dynes, M. Smedal, Radium Therapy and Nuclear Medicine: Am. J. Roentgenol., January 1960)

Pulmonary Alveolar Proteinosis. On the basis of examination of sputum—microscopic appearance and histochemistry—a tentative or clinical diagnosis of alveolar proteinosis has been made by the authors. Sputum is placed in formalin fixative, and sections are prepared by means of the usual histologic techniques. If this is a valid means of laboratory examination, more cases may be recognized by other observers at a time more suitable for investigation than at autopsy. (D. Carlson, E. Mason, Am. J. Clin. Path., January 1960)

Acute Iron Poisoning. The use of edathamil calcium-disodium by vein and disodium orthophosphate by mouth is suggested as an addition to the customary measures to combat shock, acidosis, and tissue damage in children suffering from acute iron poisoning. (W. Bronson, T. Sisson, A.M.A. J. Dis. Child., January 1960)

Treatment of Tuberculosis with Cycloserine. Results of combined therapy with cycloserine, 0.5 gm. and isoniazid, 300 mg. daily in 12 patients have been generally unfavorable. In cases that respond favorably, it appears that the bacteriologic and radiologic response is slower than with combinations of streptomycin, PAS, and INH. Failure of cycloserine to delay emergence of INH resistant organisms was noted in three cases. (I. Schwartz, M. Small, Dis. Chest, January 1960)

Acne, Estrogens, and Spermatozoa. Employing Premarin over a 3-month period, the authors observed a definite decrease in oiliness of the skin and a number of acne lesions, without significant alteration in spermatogenesis. (J. Mullins, A.M.A. Arch. Dermat., January 1960)

Fluorescent Treponemal Antibody Test for Syphilis. The FTA test apparently measures the same antibody as the TPI test. Therefore, if its sensitivity and specificity are confirmed to be as reliable as the TPI test, it may become a much more simple and inexpensive test for resolution of problems of interpretation of reactions in serologic tests for syphilis. (S. Olansky, G. McCormick Jr., A. M. A. Arch. Dermat., January 1960)

Griseofulvin. The authors confirm the effectiveness of this antifungal antibiotic on oral administration in the treatment of a variety of superficial mycoses. Clinical and experimental studies indicate that it is fungistatic rather than fungicidal in action, and that dermatophytes which are susceptible may eventually develop resistant strains. (H. Robinson Jr., et al., A. M. A. Arch. Dermat., January 1960)

X-Ray Determination of Total Lung Capacity. A simple, rapid, and accurate method of roentgenographic determination of total lung capacity is presented. Compared with conventional physiologic measurements, a high degree of correlation was found in healthy young and old subjects, and patients with congestive heart failure. A significantly lower correlation was found in patients with emphysema. (H. Barnhard, et al., Am. J. Med., January 1960)

Diabetic Acidosis. A comprehensive evaluation of the cause, course, and therapy of 73 cases of diabetic acidosis is presented. The role of emotional disturbances, as well as infections, in precipitating the acidosis was stressed. The early use of large doses of insulin was perhaps the most significant therapeutic measure. The dangers of indwelling catheters and use of antibiotics only for specific infections were emphasized. (A. Cohen, et al., Ann. Int. Med., January 1960)

Mitral Stenosis and Biliary Tract Disease. Review of 400 patients operated upon for mitral stenosis revealed a higher incidence of biliary tract disease in those patients than in the general population. Hepatic congestion associated with episodes of transient right heart failure is the possible etiologic factor. Evaluation of the biliary tract before mitral valvulotomy is stressed, and when surgery is indicated, biliary tract surgery should be performed before valvulotomy. (F. Glenn, Ann. Surg., January 1960)

Long-Acting Sulfonamide. From studies made at Baylor University, the authors demonstrated that sulfadimethoxine (Madribon) is rapidly absorbed, and following determined average dosage reaches therapeutic levels in 2 hours, which level is maintained for 24 hours in adults. The optimal dosage schedule was 2.0 gm. initially followed by 1.0 gm. daily. (T. Sakuma, et al., Am. J. Med. Sci., January 1960)

Recent Research Reports

U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla.

1. The Ballistocardiographic Response to Hyperthermia. Subtask No. 6, Report No. 6, MR 005. 13-7004, 17 September 1959.
2. Use of Artificial Contrails to Increase the Visibility of Aircraft. Subtask No. 2, Report No. 17, MR005. 13-6004, 12 October 1959.
3. Observations on Human Subjects Living in a "Slow Rotation Room" for Periods of Two Days: Canal Sickness. MR005. 13-6001, Subtask No. 1, Report No. 49, 15 October 1959.

U.S. Naval Radiological Defense Laboratory, San Francisco 24, Calif.

1. Effects of Total Body Irradiation of Dogs with Simulated Fission Neutrons. USNRDL-TR-293, 16 December 1958.
2. Liver Lymph Formation, Fluid Compartment in the Liver and Ascites Formation. USNRDL-TR-301, 10 February 1959.
3. Observations on Regulation of Erythropoiesis and on Cellular Dynamics by Fe59 Autoradiography. USNRDL-TR-300, 18 February 1959.
4. Attempts to Reproduce Cirrhosis of the Liver in Rats Following Total-Body Irradiation. USNRDL-TR-304, 26 February 1959.
5. The Liver in Hypothermia. USNRDL-TR-307, 13 March 1959.
6. Changes in Liver Function and Structure Due to Experimental Passive Congestion Under Controlled Hepatic Vein Pressures. USNRDL-TR-306, 16 March 1959.
7. Functional Differences Between Liver Regions Supplied by the Hepatic Artery and by the Portal Vein. USNRDL-TR-310, 20 March 1959.
8. Total Exchangeable Potassium and Chloride and Total Body Water in Healthy Men of Varying Water and Fat Content. USNRDL-TR-313, 23 March 1959.
9. Some Aspects of Recent Findings Pertaining to the Body Composition of Athletes, Obese Individuals, and Patients. USNRDL-TR-339, 30 June 1959.
10. Comments on the Determination of Whole Body Density and a Resume of Body Composition Data. USNRDL-TR-340, 16 July 1959.

U.S. Naval Medical Research Unit No. 2, Taipei, Taiwan (APO 63, San Francisco, Calif.).

1. Etiologic Studies of Trachoma on Taiwan. MR005. 09-1201. 12. 1, 10 December 1959.
2. Trachoma: Studies of Etiology, Laboratory Diagnosis and Prevention. MR005. 09-1201. 12. 2, 31 December 1959.

DENTAL SECTION

Fluoridation Decline Hit

Arthur S. Flemming, Secretary of the Department of Health, Education, and Welfare once again has put his stamp of approval on fluoridation, urging citizens in communities served by public water supplies "to consider the facts about this important health measure." In a year-end statement, Secretary Flemming expressed disappointment over the apparent trend away from fluoridation. He said that, since 1956, the urban population has increased by approximately 7.5 million, while the number of people drinking fluoridated water has risen 4.2 million. In contrast, he noted that during 1954 - 1956 while the urban population was expanding by 5 million, the number of people served by fluoridated water increased by more than 10 million. Said the Secretary: "This formerly encouraging trend has now been reversed, and progress of the fluoridation program has declined sharply."

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Polishing Gold Castings

For the past several years, a standardized procedure for polishing gold castings, developed by H. M. Tanner, has been used at the U. S. Naval Dental School, Bethesda, Md. The technique achieves precise results rapidly, and can be learned easily.

Necessary instruments are stored in a plastic block in the correct order of usage: one 3/4" carborundum disk, one No. 2F Cratex rubber wheel, one 5/8" rubber sulci wheel, one No. 558 steel fissure bur, one No. 00 bud bur, one midget rubber sulci wheel (with a small-headed mandrel), one No. 0 bud finishing bur, one 5/8" felt wheel, two 3/4" soft wheel brushes, and one 1" rag wheel. A handpiece which produces mandrel speeds of 25,000 to 40,000 rpm is used. The following polishing procedure is utilized:

1. The sprue is cut off, the sprue pin attachment area is recontoured, and any rough surfaces are reduced with the 3/4" carborundum separating disk.

2. All axial surfaces are smoothed from the tips of the cusps to within 1 mm. of the margins, with the No. 2F Cratex rubber wheel.

3. The surfaces are polished with the 5/8" rubber sulci wheel. Because of the coarse abrasive imbedded in the wheel, the instrument is not carried onto the occlusal surface or onto the 1 mm. space adjacent to the margins.

4. Finishing of the occlusal surfaces is initiated with the No. 558 steel bur. The side of the tip of the bur is placed into the grooves, and the grooves are defined by creating V-shaped cuts.

5. A No. 00 bur is placed in the grooves and manipulated with a wiping or sweeping motion. Thus, the grooves are blended up onto the inclined planes, and the V-shaped cuts are softened.

6. The midget sulci wheel is used to polish the grooves, fissures, spillways, and the cuspal inclined planes.

7. The No. 0 bud finishing bur is manipulated in the same positions and in the same manner as the No. 00 bud bur; this burnishes and smooths the grooves which were not reached by the midget sulci wheel.

8. The 5/8" felt wheel is used with tripoli to polish the axial surfaces of the casting from the tips of the cusps to within 1 mm. of the margins. When the proper sweeping motion and adequate pressures are used, the axial surfaces become highly polished.

9. A 3/4" soft wheel brush is used with tripoli to polish and initiate the final finish of the occlusal anatomy. During applications of the wheel, the handpiece is rotated at maximum speed.

10. A 3/4" soft wheel brush is used with jewelers' rouge to complete the high polish of the occlusal surfaces.

11. The 1" rag wheel, used with very little rouge, is rotated at maximum speed and moved over all occlusal and axial surfaces to create the final high luster of the casting.

(CDR Richard R. Troxell DC USN, J. Pros. Dent., July - August 1959; and Dental Abstracts, January 1960)

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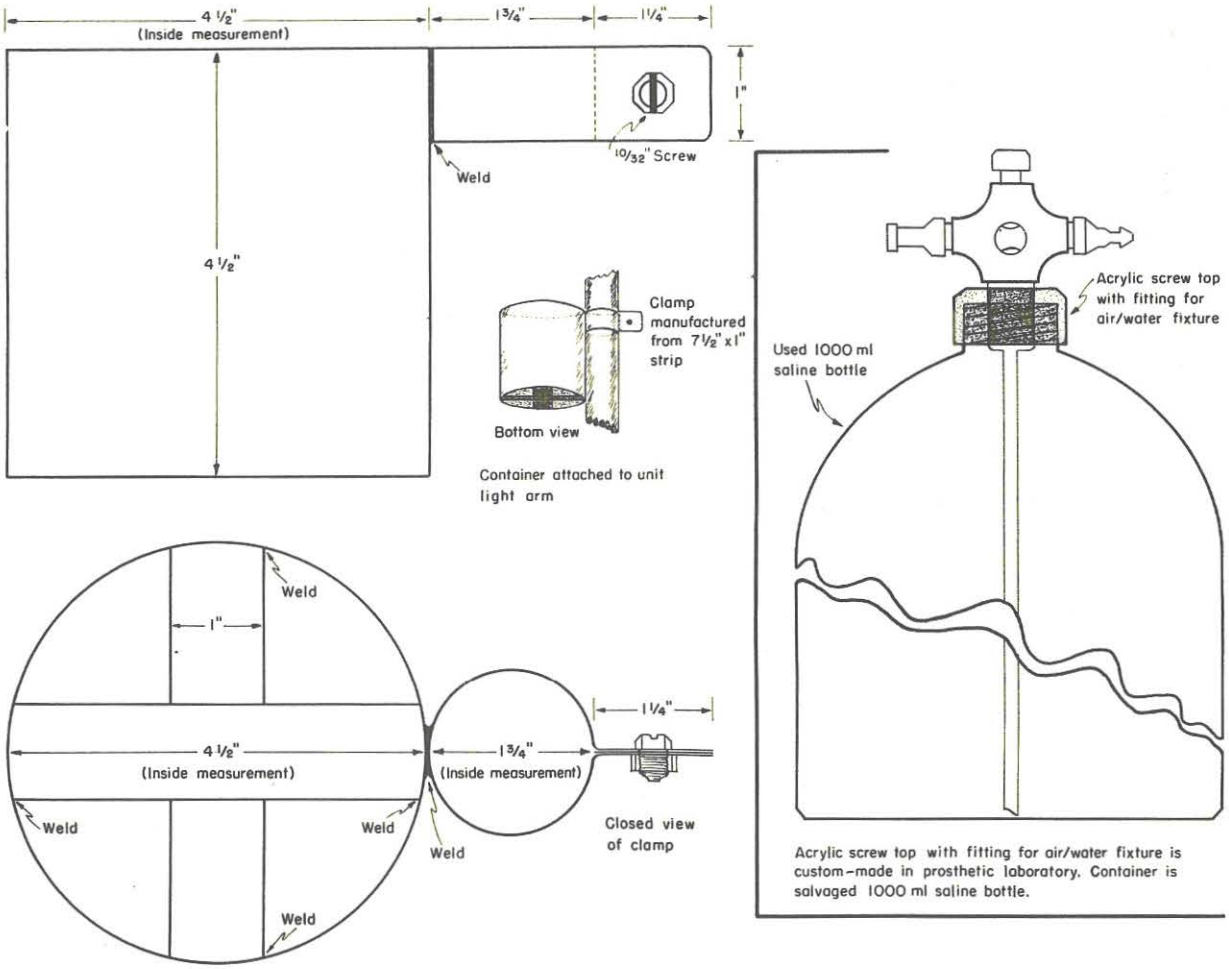
Course in Crown and Bridge Prosthesis

A short postgraduate course in Crown and Bridge Prosthesis, part of the Navy Dental Corps' Continuous Training Program, will be presented at the U. S. Naval Dental School, NNMC, Bethesda, Md., 18 - 22 April 1960. CAPT H. H. Fridley DC USN, Diplomate, American Board of Crown and Bridge Dentistry, will be the instructor. Lectures, seminars, demonstrations, laboratory and high speed operative procedures, use of various preparations and impression materials, waxing and investing procedures will be presented.

Quotas have been assigned to the First, Third, Fourth, Fifth, Sixth, and Ninth Naval Districts; and the Potomac River, Severn River, and Naval Air Reserve Training Commands.

Improved Water Spray Bottle and Holder



Harvey B. Watson DT1 USN, U.S. Naval Air Station, Memphis, Tenn., working with Constance W. Alber, civil service employee of the dental department, has devised an improved water spray bottle and holder for the dental operating unit. With the old equipment, the bottle had to be refilled as often as twice during one sitting, slowing operations and causing inconvenience to the dental officer and the patient.

The new bottle and holder which will fit onto present dental units reduces refilling to once or twice a week. Details of the bottle and holder are published for information and possible utilization where applicable.

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Repair Contract for Handpieces

The Bureau of Medicine and Surgery is distributing the contract negotiated with Midwest Dental Mfg. Co. for repair of higher speed handpieces. Provisions of this contract are effective from 1 March 1960 to 28 February 1961. In addition to Repair Jobs included in the previous contract, the present contract lists Repair Jobs for conversion of FF-N type contra-angles for use with the Lubri-Kleen System, installation of Trans-speed transmission to straight handpieces No. 100R or 100H, and Repair Job for the Air Drive Angle Handpiece, Catalog No. 432-2L. Additional copies of this contract may be obtained from Chief, Field Branch (Code 42B), Bureau of Medicine and Surgery, 29th Street and 3rd Avenue, Brooklyn 32, N. Y.

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Personnel and Professional Notes

CAPT Anderson Appointed Naval Aide. CAPT Philip Anderson DC USNR, Portland Me., has been appointed naval aide to Governor John H. Reed. He is the first member of Reed's personal staff to be named since the Governor took office, 30 December 1959, succeeding the late Clinton A. Clauson. Of the eleven members of the governor's staff, four are members by law—state commanders of American Legion, Veterans of Foreign Wars, Amvets, and Disabled American Veterans—and seven are appointed: one naval aid with the rank of captain, and six officers with the rank of colonel, representing the Army and Air Force.

CAPT Anderson, appointed LT (jg) DC USNR in 1940, was called to active duty in March 1941, and subsequently served as an assistant dental officer at the U. S. Naval Air Station, Corpus Christi, Texas; on board USS DIXIE; and at the U. S. Naval Training Center, Sampson, N. Y. While on board the DIXIE, CAPT Anderson earned the South Pacific Campaign medal with one star. In September 1945, he was released from active duty, and has since actively participated in the programs of the U. S. Naval Reserve, presently performing appropriate duty in connection with conducting dental examinations and maintenance of dental records and reports at the U. S. Naval Reserve Training Center, Portland, Me.

"Your Navy and Your Future," the Navy's newest seapower presentation, was attended by staff and postgraduate Dental officers of the U. S. Naval Dental School, 22 January 1960. CAPT W. F. Schlech, Jr. USN, Director, Progress Analysis Group, Office of the Chief of Naval Operations, gave the slide presentation which is based on facts to point up the need for a strong Navy now and in the future. CAPT Schlech outlined the world situation and the threat facing our nation today, highlighting the Navy's role as a power

for peace; and concluded the program with the film, "Summer Incident," dealing with U.S. seapower and the Lebanese crisis. The presentation was televised over the Medical Educational Distribution System from the National Naval Medical Center to the Walter Reed Army Medical Center, Andrews Air Force Base, Fort George G. Meade, and Fort Belvoir.

Applications Invited for Clinical Laboratory Training. Applications are invited for training in Clinical Laboratory Technic. Dental ratings with primary Navy Enlisted Classification 0000 and in the third segment of the SEAVEY (October 1959) are encouraged to submit requests. Applications must be submitted in accordance with BuMed Instruction 1510.2B.

Doctor Muhler Lectures at NDS. At the U.S. Naval Dental School, NNMC, Bethesda, Md., Dr. Joseph C. Muhler, well-known dental researcher, discussed recently acquired information and data on the efficacy of topical fluoride compounds as a practical means of controlling dental caries. Before the lecture, Dr. Muhler conferred informally with staff research personnel of the Naval Medical Research Institute and the Dental School. Dr. Muhler, Professor in the Department of Biochemistry, Indiana University Medical Center, is a well-known author and is Editor of the Journal of the Indiana State Dental Association.

Reserve Dental Company 8-5. CAPT H.J. Wunderlich DC USNR, head, Dental Reserve Branch, Bureau of Medicine and Surgery, recently discussed "Current Policies and Regulations of the Navy Reserve Dental Corps" at a special meeting of the U.S. Naval Reserve Dental Company 8-5 in Dallas, Texas. At the same meeting, Dr. Peter Simon of Fort Worth, Texas, presented a lecture utilizing the U.S. Navy Dental Corps Correspondence Course, "Endodontics, NavPers 10407" illustrated with 35 mm. color slides. CAPT P.J. Murphy DC USNR is Commanding Officer of the Company and CAPT E.T. Gillean DC USNR is Executive Officer.

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NOTE: The first sentence, par. 3, p. 30, No. 4, Vol. 35, of the Medical News Letter should read: Decrease milliampere output of the x-ray machine from 10 MA to 2-1/2 MA. On machines (such as the General Electric Model E) which have no MA dial adjustment, the output can easily be reduced by necessary adjustments of the points on the stabilizer by a dental repairmen.

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RESERVE SECTION

Reservists' Tax Deductions

Have you started figuring your 1959 income taxes yet? You may be entitled to certain deductions because of your participation in the Naval Reserve.

Reservists on inactive duty may deduct transportation costs involved in attending drills. They may also be allowed to deduct amounts spent for the purchase and maintenance of their naval uniforms.

Here is the latest word on income tax deductions for Reservists:

TRAVEL AND TRANSPORTATION EXPENSES

Travel and transportation allowances paid by the Navy Department while you are in a mileage or per diem status are considered to be an accounting to your employer.

If you broke even—or if you do not choose to deduct excess expenses—you may simply answer "yes" to the questions relating to travel on page 1, Form 1040 or 1040W, or check Item 8, page 1, Form 1040A, and forget the matter.

However, if allowances exceeded expenses, you should answer "yes" to the questions on page 1 of Form 1040 or 1040W and enter the excess labeled "excess reimbursements," as "wages."

If you claim excess expenses—or if no allowances were authorized—all allowances, reimbursements, and expenses must be listed. Excess expenses are computed on IRS Form 2106 and deducted from your Navy pay, if any, before entering the net wages or expenses as "wages" on page 1 of Form 1040 or 1040W.

"Travel expenses" include meals and lodging of Reservists who, under competent orders and with or without compensation, are required to remain away from their principal place of business overnight in the performance of authorized drill and training duty.

"Transportation expenses" of Reservists incurred in the performance of authorized drills under competent orders are allowed from the principal place of business to the place of drill—provided that Reservists are not reimbursed—even though the Reservists do not remain away overnight.

Reservists who return home before reporting for drill may deduct one-way expenses from home to place of drill. However, this amount may not exceed the expense from place of business to place of drill.

There is no authority in either the Internal Revenue Code or regulations for a flat rate-per-mile deduction for transportation expenses when you travel in your own automobile.

Expenses of an automobile would ordinarily include such items as gasoline, oil, minor repairs, depreciation, and the like. If a record is kept of all automobile expenses for the year, you may easily determine the amount of deduction for your drill trips. One way to do this is to take the ratio of the total mileage of your drill trips to the total mileage for the year, and apply that percentage to your total expenses for the year.

The Internal Revenue Service has accepted a reasonable rate-per-mile in lieu of actual automobile costs under certain circumstances up to 7 or 8 cents per mile. This is a "rule of thumb" practice, however, and has no basis in law or regulation.

UNIFORM COSTS

You may deduct the amounts spent for the purchase and maintenance of uniforms for federal income tax purposes if your uniform expenses were not covered by nontaxable allowances or uniform gratuities.

An Internal Revenue Service ruling states that the deduction is allowed as an "ordinary and necessary business expense" when uniforms are required and allowed to be worn only when on active duty for training for temporary periods, when attending service school courses and training assemblies (drills).

If you are on inactive duty, you may deduct not only the cost of uniforms required for training duty and drills, but the maintenance of these uniforms. However, if you receive a uniform gratuity, your expenses are deductible only to the extent that they exceed your uniform gratuity in that particular year.

Here's an example: You may deduct the cost—purchase price and maintenance—of uniforms bought in 1959 when you file your 1959 federal income tax return. If you received a uniform gratuity in 1959 of, say, $100 and the cost and maintenance of your uniforms amounted to $150, you may deduct $50 on your tax return. If you received no uniform gratuity in 1959, you may deduct the entire sum—in this instance $150. A uniform gratuity received in 1960 need not be considered except with respect to expenses incurred in 1960.

Reservists serving on full-time active duty may only deduct the cost of all items of insignia of rank and corps.

Additional information on income tax deductions may be found in the "Federal Income Tax Informatiom for Service Personnel" pamphlet, prepared annually by the Judge Advocate General. Copies of this pamphlet should be available at your Naval Reserve Training Center or the nearest naval activity. (The Naval Reservist, February 1960)

American Board Certifications - Inactive Reserve Officers

American Board of Internal Medicine

LT Edward G. Bond
LCDR Curtland C. Brown Jr.
LT Bertram J. Channick
CDR John J. Donnell
(Cardiovascular Disease)
LCDR Gerald Durkan
LCDR Frederic W. Easton III
LT John T. Flynn
LCDR Leo Oliner
LT Hugh M. Pratt
LT James M. Stormont
LT Frederick D. Whiting

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OCCUPATIONAL MEDICINE

Impact of Influenza Epidemic on a Civilian Community

In anticipation of a probable outbreak of Asian influenza in the fall of 1957, an unusual opportunity was provided to study the effects of community action to reduce the impact of a predicted epidemic. Accordingly, the Public Health Service undertook such a study in September 1957. The report describes evaluation of the impact of the threat and occurrence of an epidemic on the operations of selected industries and hospitals. Separate reports will describe the epidemiology of influenza, as well as the impact on families and special population groups, and on selected community health and welfare organizations.

A sample of hospitals and industries (including public services) in five cities of two states was surveyed to determine the response among these organizations to the threat and later occurrence of an epidemic. Personnel of the Public Health Service's Occupational Health Program and the Division of Hospital and Medical Facilities assumed responsibility for (1) developing specific tools for collecting needed data, and (2) supervising data collection.

Initial visits to plants and hospitals took place during the first 3 weeks of October 1957. Follow-up visits or inquiries were concluded by 31 December 1957.

Two kinds of tools were used. Personal interviews were conducted with representatives of each surveyed industry and hospital to collect data on pre-epidemic expectations and preparations. For example: What was anticipated? What controls and plans, if any, were being made? In addition, objective questionnaires were left with each organization for recording later data on the nature and extent of absenteeism by cause, on production levels, and other information relevant to industries and hospitals. This information concerned bed distributions, bed occupancy, size and composition of staff, and effects of epidemic upon level of services, personnel absenteeism rates, and demand for services.

There was particular interest in the question: To what extent would given levels of absenteeism during epidemic reduce the productive ability or level of services of the organizations?

Findings from Industry. (1) Limitations of Data. Two major limitations in the collected data must be noted. The first concerns timing of the study which was designed to obtain data on expectations and preparations prior to high incidence of respiratory disease. Actually, peak epidemic periods developed to coincide roughly with the dates of initial interviews. As a consequence, respondents' answers to questions about their pre-epidemic expectations had to be retrospective. Intervening events tended to bias memory.

The second limitation evolved from the difficulty in obtaining objective and comparable measures of industrial production. Companies are understandably reluctant to disclose production figures, even on the basis of an index. It was possible to obtain differential production estimates for the epidemic period and for comparable non-epidemic periods. However, such data reflected a ratio based largely on the recall of company officials interviewed.

(2) Expectations for Epidemic. Prior concern was demonstrated in only a few of the industries studied about the potential hampering effects of an epidemic of Asian influenza upon their operations. Where concern was expressed, it related primarily to delays in delivery of vaccine, or inability to get it. The industries studied generally anticipated a rise in absenteeism, but did not believe it would be extensive enough to affect production. There were expressions that production problems could be handled if absenteeism did not exceed 20%.

(3) Preparations for Epidemic. Twenty-five of the 32 plants studied offered vaccination to employees at varying times through mid-December 1957. However, with the few exceptions discussed below, no preparations other than vaccination were made by the plants. This seems to support the hypothesis that the vaccine was believed to be highly effective; this belief underlay the general lack of concern over the impact of epidemic. Expressions of confidence in vaccinations as protection against epidemic were

frequent. Industries demonstrated marked confidence in their ability to meet emergencies that might arise.

Two plants made preparations in addition to vaccination: one distributed notices to workers advising them to stay at home if they developed fever or other symptoms of respiratory infection; and one increased the janitorial staff to keep down the spread of infection.

(4) Impact of Epidemic and Steps Taken to Reduce It. In general, the impact of the epidemic on plants was minimal. Absenteeism never became a serious problem and production and services did not fall off.

In 20 plants in which comparable data were obtained, the periods of maximum absenteeism occurred during the last 2 weeks of October and the first 2 weeks of November. During that period, the average number of employees absent from work on a given day ranged from 1/2 to 13%. The median absentee rate was 5.5%. Naturally, the average percentage of employees absent for a longer period of time was much less. In three cities where data were available, the average proportion of workers off one or more days during the 2-week period of highest incidence ranged from 2 to 10%. Where data were available, 68 to 90% of sickness absences during October and November could be attributed to respiratory disease.

The average number of days off because of sickness during October and November was between one and two days. In three companies in which sickness absences could be broken down by respiratory disease, affected workers lost on the average of three to four work days.

Over the epidemic period, normal production and services generally were not affected. Temporary pressures in some plants occurred; but the companies were well able to handle these through such expedients as interchanging workers among shifts or machines, increasing overtime authorizations, and temporarily hiring "on call" workers or those recently laid off.

Findings from Hospitals. (1) Characteristics of Hospitals Studied. Seventeen general hospitals were surveyed with a total bed complement of 4,228. The range in number of beds was 45 through 516.

(2) Expectations for Epidemic. Most hospital administrators felt little concern about the ability of their hospitals to meet any demands arising from this epidemic. They felt that there would be little change from their present operations, because few people would require hospitalization if admissions were restricted to complicated cases. Only 41% (7) of the 17 hospitals' administrators had even discussed the problem with their medical staffs and only 23% (4) prepared a written plan of action.

(3) Preparations for Epidemic. All hospitals obtained Asian influenza vaccine and inoculated their personnel. Some hospitals gave 0.1 ml. intracutaneous injections, others gave 1.0 ml. subcutaneously. The dosage used for vaccination seemed to be based more on availability of vaccine than on opinions of the extent of protection provided.

An admission policy to be enforced during the time of the epidemic was developed by 29% (5) of the hospitals. Many hospital administrators thought

that an admission policy would probably be necessary, but were not taking steps to establish one. Written diseaster plans were completed in 53% (10) of the hospitals; however, only 23% (4) had ever held a practice run.

There were only two instances of a joint agreement among hospitals. One was established to insure an equal distribution of patients; in the other, a joint agreement was reached regarding hospital visitors.

(4) Impact of Epidemic and Steps Taken to Reduce It. Ten of the 17 hospitals reported no unusual increase in absenteeism during the epidemic period. The remaining 7 experienced greater absenteeism than was normal Four of these were understaffed in the nursing department; the remaining 3 experienced no staffing problems. With one exception, hospitals operated as usual. In the one exception, the hospital invoked policies established earlier for use during epidemic which followed the recommendations of the American Hospital Association in establishing isolation techniques, restricting admission of respiratory infections to complicated cases, locating all such cases in one part of the hospital, and restricting visitors.

Conclusions. The influenza outbreaks occurring during the fall of 1957 did not materially affect the level of services provided or the production of sampled industries, public services, and hospitals. This was due to a combination of relatively low absentee rates and the mildness and short duration of the illness.

Employee vaccination programs were developed by 25 of the 32 industries as well as all 17 hospitals included in the survey. However, planning and preparation beyond vaccination were minimal. It is, therefore, conjectural how industry would have fared had absenteeism reached higher levels, had the disease been severe enough to disable workers for longer periods, or had labor pools not been available for temporary employment.

It seems reasonable that the lack of prior coordinated planning by hospitals in the communities studied reduced their capability of handling the impact of a serious epidemic if one had occurred. It is suggested that more effective coordinated hospital planning would be needed to control serious community health emergencies in the future. (Rosenstock, I. M., Burgoon, D., Colby, J. D., Trasko, V. M., Impact of an Influenza Epidemic on a Civilian Community - Effects Upon Selected Industries and Hospitals: Mil. Med., December 1959)

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Philosophy of Rehabilitation

The basic concern of rehabilitation is not with programs and conferences, not with different professions and disciplines, and not with techniques and apparatus. The basic concern of rehabilitation is with people.

People don't live in isolated booths. They do not suffer in isolation nor should they be rehabilitated in isolation. The person must be considered as part of a community rather than as a specified individual who has certain things wrong with him, or who, simply from the standpoint of inactivity or other aging processes, has become unable to fulfill his accustomed place in society. The community must recognize this problem and must face it; the community as a whole must find an answer to it. Community planning is needed.

The philosophy of rehabilitation has been aptly expressed many times by many people. As long ago as 1895, Dr. Simon Baruch, the father of Bernard Baruch, stated in his report as Chairman of the staff of Montefiore Hospital for the chronically ill in New York City, "It will be a proud achievement when our records will tell that a goodly proportion of those who have entered our gates, only to die in peace, have again issued from them entirely or partially restored and enabled again to enter upon the battle of life from which they had regarded themselves as permanently banished." Dr. Baruch's concept is the essence of rehabilitation philosophy. The purpose is to take damaged people and return them to their proper place in society.

Rehabilitation has been defined as restoring the impaired individual to his optimum place in society—physically, emotionally, socially, and vocationally. All of these aspects of his life are taken into account and an attempt is made to improve him in all of these areas.

Physical restoration should be a joint effort by many different individuals. Physicians, nurses, therapists—whether they be speech, occupational, or physical therapists, prosthetists or orthotists—all contribute to the physical restoration of the patient. They play individual roles, but in a joint fashion. All fields of medicine are utilized, but to a large extent, physical medicine is the foundation of the whole program. Physical medicine, of course, includes physical therapy, occupational therapy, and the rehabilitation techniques that are carried out in a physical medicine department.

Physical therapy includes any type of treatment by physical means—heat, cold, water, light, electricity, massage, or exercise. In occupational therapy, crafts and arts with remedial objectives are used as means of treatment. Braces, splints, and prostheses are ordered as needed to support and strengthen the patients. By combining all efforts, it is possible to restore people to their maximum physical potential. If they have arthritis, for example, the internist, the nurse, the occupational therapist, and the physical therapist can all get together on a combined program of improving range of motion and strength in the involved joints, reducing pain, and attempting to get the arthritis under control.

While the individual is being physically restored, the other aspects of this program should be proceeding, providing him with a correct mental atmosphere. Motivation is the key to the whole problem. Getting these people to understand that they must make the most of what is left, and not worry about

what has been lost, is important. These people need much love and understanding. Time and sympathy are essential to getting a good firm footing so that they will feel needed. They must believe that they have a place in society and that society wants them to have that place. Those who are caring for them must motivate them, must get them to feel that this is what they should do. Without such motivation, the rest of the program would be virtually ineffective.

In addition, the social environment of the individual fits in closely with his mental picture. Community programs play a more important role as one gets into the social aspect of life, whether this be a community-life experience, such as the Presbyterian Village in Dearborn where individuals live together in a community setting, or whether it be for purely recreational purposes. This type of atmosphere is important to these people; they must have a social-mental outlook which is uplifting and which will make them want to get out and have a more important place in society.

The economic aspects are tremendous, both from the individual's and the community's standpoints. In considering the investment, one must consider not merely dollars involved, but what is to be accomplished. During the Korean action and the latter part of World War II, there was a manpower shortage and additional workers were needed. The problem was where to find them; this helped to point up the present program of rehabilitation. It was at this time that Bernard Baruch stated that the investment in rehabilitation is an investment in the greatest and most valuable of the country's possessions—its human resources. The present attitude is to conserve human resources, to get these people back to their optimum physical and mental status so that they will be active contributing individuals in the community. Federal, state, and local programs have been initiated and are available for help in rehabilitation planning throughout the communities, and they certainly should be called upon as needed.

Vocational aspects of rehabilitation involve testing these individuals for their aptitudes, counseling them after the testing so that it can be explained to them where their maximum utilization will lie, and training them. Training can be prevocational or vocational. This is a continuing program; it begins in the hospital or nursing home and carries over to the community program so that the individual fits into a spot which has to some extent been prepared for him. It is not only the vocational aspects that should carry over but the physical, social, mental, and economic programs as well, so that the individual actually becomes integrated as part of the community.

One concept of the philosophy of rehabilitation has been quoted by Dr. Donahue in The Rehabilitation of the Older Worker. "That this is a hard task, none who knows the hospital life can doubt. That it needs special qualities and special effort, quite other than the average range of hospital devotion, is obvious. But it saves time in the end, and without it success is more than doubtful. The crucial period is the time spent in the hospital.

Use that period to recreate not only the body, but the mind and willpower, and all shall come out right; neglect to use it thus and the heart of many a sufferer and of many a would-be healer will break from sheer discouragement. A niche of usefulness and self-respect exists for every man, however handicapped; but that niche must be found for him. To carry the process of restoration short of this is to leave the cathedral without a spire. To restore him, and with him the future of our countries, that is the sacred work." (Bender. L. F., Philosophy of Rehabilitation: Indust. Med. and Surg., January 1960)

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Failure in Temperature Regulation During Progressive Dehydration

Fourteen healthy young medical students (mean values for height, weight, and surface area: 181 cm.; 77.3 Kg; 2.04m^2) were exposed at rest and unclothed for 12 hours to a constant ambient temperature of 43.3° C. (110° F.) with vapor pressures from 20.7 to 33.5 mm. Hg. Water and food were witheld leading to progressive dehydration which occurred at an average rate of 180 gm. /M^2/hr. Oral temperature rose 0.9° C. during the last 7 hours. Sweat rate during exposure failed to increase and cutaneous blood flow tended to decrease. This is in contrast to observations in well-hydrated subjects in which the authors previously reported an increase in sweat rate of 300 gm. /M^2/hr. per 1° C. rise in oral temperature.

Failure of body temperature regulation during progressive dehydration is consistent with previous studies by others which show that the threshold for sweating increases with rising osmotic pressure of tissue fluids. (Hertzman, A. R., Ferguson, I. D., WADC Technical Report 50-398, Aeromedical Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, July 1959)

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Industrial Health Conference - Special Navy Meeting

As a part of the 1960 Industrial Health Conference at the Manger Hotel, Rochester, N. Y., a special program for Navy personnel will be held in the Assembly Room, 0830-1630, Monday, 25 April. Subjects to be discussed by panels of experienced Naval personnel include: Submarine Radiological Health Program; Man in Space; Hearing Conservation Program; and other subjects of importance to industrial medical and hygiene personnel engaged in Navy's Occupational Health Program.

General Motors' Industrial Hygiene Service

Healthy satisfied employees represent one of industry's strongest assets—often more valuable than the most complex machine. But man, too, is a complex mechanism of limited durability who will fail or falter when subjected to chemical or physical stresses beyond his capacities.

Recognizing these human limitations and the need for conserving health, progressive managements have established programs to protect employees from undue stress and industrial disease. One phase of such programs is Industrial Hygiene—the science and art of preserving health through recognition, evaluation, and control of environmental sources and causes of illness in industry.

Service Available. General Motors was one of the first to establish an Industrial Hygiene Department with the responsibility for directing a field service and providing consultation on related matters to all divisions. The experience of this department has been extensive and diversified, and is available to any division with environmental problems.

Insuring Healthful Work Places. Each year new chemicals are introduced into industry. They frequently have toxic properties and, if inadequately controlled, can produce conditions that may interfere with the health and well-being of the employee.

Evaluating Exposures. Members of the Industrial Hygiene Department evaluate exposures arising from toxic compounds by surveys of working environment. Upon request, or during routine visits to each plant of the Corporation, major attention is given to the study of exposures to such substances as chromates, acid and alkali mists at plating operations; silica dust in foundries or at sand blast operations; cadmium, zinc, or iron fumes associated with welding operations; lead fumes and dust from soldering, body finishing, or bearing manufacturing; solvent vapor from painting or cleaning activities; and nuisance dust exposures from grinding on nontoxic metals, such as steel or cast iron.

In addition to long recognized exposures, studies are also made of the newer metals, chemicals, and diversified materials now being used in manufacturing processes. These include studies of the possibility of environmental contamination from beryllium, epoxy resins, isocyanates, naturally radioactive metals or compounds of uranium and thorium as well as man-made radioisotopes.

After recognizing the existence of a potential exposure, the degree of contamination must be determined. When possible, direct-reading instruments are employed in plant surveys. These devices permit study of variations in the environmental levels of contamination at the site of the operation. Frequently, however, instrumentation of this type is not available, necessitating the removal of a sample of the contaminant from the air for subsequent analysis in the laboratory—an essential part of the Department's activity.

Laboratory analyses include microtechniques for quantitatively determining concentrations of dusts, gases, and mists including toxic metals and compounds, solvents, and other organic compounds. When dust concentrations are of concern, count and particle size distribution are accomplished by microscopic methods. In addition, when investigations require the use of an electron microscope, infrared analyzer, x-ray diffraction equipment, or other highly specialized instrumentation, these facilities are available.

The laboratory of the Industrial Hygiene Department also provides a service to the Corporation's medical directors in analyzing biologic samples to determine early absorption in advance of ill effects. Most notable in this respect is the blood-lead program. More than a decade of experience has verified that analytic findings of lead in blood are reliable indices of the degree of lead exposure and absorption. Annually, approximately 10,000 blood specimens from U. S. and overseas employees are examined for lead. The information obtained by this technique serves as a continuing survey of environmental conditions and, more significantly, provides laboratory data to be used by the plant physician in evaluating employee health.

The use of biologic specimens is also applicable to other exposures including benzene, mercury, natural and man-made radioactive isotopes, and to a limited extent, beryllium.

Ventilation. A satisfactory industrial environment is to a large degree dependent upon ventilation. Comments reaching the Industrial Hygiene Department are frequently related to lack of air motion, of one's being too hot or too cold, or to the existence of nuisance conditions created by low levels of oil mist, smoke, or dust. By proper application of both exhaust ventilation and air-supply systems, these conditions can be materially improved and maximum benefit obtained from equipment provided. Basic factors, including location of air-supply and heating units coupled with recognition that the cooling rate of the human body must be controlled, are frequently overlooked in designs for improving an existing condition and layouts of ventilation for new building construction. The Industrial Hygiene Department approaches problems with these factors in mind. More effective use of air motion, at reduced cost, has resulted.

Reduction of Physical Stresses. While environmental exposures to chemical hazards have long been of vital concern, the effects on industrial employees of physical stresses, such as radiant heat, noise, and ionizing radiation have received more recent emphasis.

The human body is equipped to effect its own heat balance through a wide range of environmental conditions. When the compensating ability of the human body is exceeded, the resultant stress causes a reduction in physical activity with loss in production and possible impairment of health.

Effective control is dependent upon an understanding of the properties and characteristics of radiant heat as well as convected and conducted heat. In addition, the benefits to be gained by the application of ventilation and/or reflective shielding must be understood. Through consultation with divisional

management, "hot spots" have been cooled to the extent that production continued where work stoppages threatened. A survey of the plant will reveal areas where these principles may be beneficially applied.

Like radiant heat, excessive noise is a major concern. This concern centers on the hearing loss of employees that develops gradually due to exposure to steady or intermittent noises related to the operation being performed.

Sensory perception of levels of noise intensity is not reliable and more scientific evaluation must be employed. Consequently, as with chemical contaminants, a survey including analysis of the frequency or pitch of the noise should be made in the plant. Such a survey provides management with basic data regarding noise exposures and potentials for producing hearing loss. Information obtained from such a study will also serve to indicate the need for, and magnitude of, a plant noise control program.

Since control of noise can be difficult and costly, a long-range program should be seriously considered. Such consideration should include plant layout, methods of operation, and inherent noise levels of tools and equipment. By initiating these basic approaches in control programs, some divisions have successfully corrected serious noise problems.

Industrial Hygiene personnel have worked closely with the divisions in control of noise sources. As with ventilation and radiant heat, basic engineering details must be incorporated in the design to accomplish the desired result; failure to do so results in costly installations of little or no sound attenuating value. The Industrial Hygiene Department invites the opportunity to review plans for noise control installations in the planning stage to assist the division in avoiding these pitfalls.

With expansion in the field of nuclear energy and its associated introduction of radioactive byproducts into industry, care must be exercised to protect industrial employees from ionizing radiations. A continuation of the expanded use of radiation sources may be anticipated since use of isotopes in manufacturing processes and as research tools is inevitable.

Ionizing radiation conditions encountered most frequently within General Motors are those associated with the use of industrial and medical x-ray units. More recently there has been a significant increase in the number of sealed sources containing natural radium or isotopes, such as Cesium 137, Cobalt 60, and Strontium 90. The expansion of radiochemistry has caused the introduction of radioactive solutions, powders, and irradiated materials. High energy power packs, such as those used in conjunction with electrostatic spray installations, are also capable of producing ionizing radiations. All of these materials and/or equipment can be used without harm to the employee provided adequate safeguards and protective measures are employed.

Establishment of adequate radiation protection involves problems of building construction, proper operating procedures, and periodic monitoring of personnel and equipment. The Industrial Hygiene Department has been

charged with reviewing at the design stage protective features of new installations to insure adequate protection of the employee. In reviewing designs, the philosophy advocated by geneticists is followed—avoid any unnecessary exposure to ionizing radiation.

Many states now have codes requiring registration of radiation sources. In some instances, these codes require that radiation surveys be performed to insure compliance with the law. Members of the Industrial Hygiene Department are available to perform these surveys and advise on the adequacy of protective measures in relation to existing or proposed uses of sources of ionizing radiation.

Consultation in Advance of Difficulty. Consultation on matters related to, or associated with, environmental problems is a major facet of the Industrial Hygiene Department's activity. The consideration of health is important in the planning stages of new processes and building construction. Not only should research, development, and construction engineers center their attention on mechanical or structural aspects of the project, but as a routine matter, they should also consider effects on the employee who must perform the operation and occupy the space. It has been the practice of some divisions to consult with the Department when new processes and materials involving toxic constituents, or materials of unknown toxicity, are being introduced. This should be standard procedure for all divisions. It enables them to utilize the experience of the Industrial Hygiene group for building into the process necessary requirements for health protection and, thus, avoids costly and frefrequently unsatisfactory modifications performed after difficulty is encountered.

The Department is also interested in studies performed by state agencies in Corporation plants. When possible to make the necessary arrangements, it is preferable for a member of the staff to be present during such studies. Experience has indicated that when this procedure is followed, the operating test conditions and related opinions are more realistic and scientifically accurate. (GM Industrial Hygiene Service: Indust. Med. & Surg., January 1960)

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Energy Requirements of Men Exposed to Solar Radiation and Heat

Heretofore, it has been generally accepted that caloric requirements of men decrease as environmental temperatures rise above 68° F. Recent studies conducted by one of the authors at Yuma, Ariz., cast doubt on this belief. The present report provides further evidence that caloric requirements increase rather than decrease during exposure either to solar heat or to high ambient temperatures. Ten subjects ate in a regular mess and were allowed water ad libitum. During each phase of the test, however,

intake of food and water was carefully assessed. Urinary volume, sweat loss, body temperature, and metabolism during rest and exercise were also measured. To obtain total caloric consumption the caloric intake as food was corrected for changes in body weight by allowing 6.8 calories for each gram of body weight change.

Caloric consumption per day in each phase was as follows: 78° F. indoors, 3137 Cal.; 78° F. exposed to sun, 3794 Cal.; 100.5° F. indoors, 3902 Cal. The latter two are significantly higher than the first.

Energy expenditure during timed exercises was the same in all three phases and there were no differences in basal metabolism or body temperature. Sweat rate, however, was two and one-half times greater during exposure to sun or high temperatures. The authors conclude that under hot conditions extra calories are utilized by temperature regulating mechanisms to transport more blood to the skin and to increase sweat production. (Shapiro, R., Consolazio, C. F., Energy Requirements of Men Exposed to Solar Radiation and Heat: U. S. ArmyMedRes&DevelCommand, Report 240, 23 July 1959)

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